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ROBUST REAL-TIME SPEECH CODEC**ABSTRACT**

Various strategies for rate/quality control and loss resiliency in an audio codec
5 are described. The various strategies can be used in combination or independently. For
example, a real-time speech codec uses intra frame coding/decoding, adaptive multi-
mode forward error correction ["FEC"], and rate/quality control techniques. Intra
frames help a decoder recover quickly from packet losses, while compression efficiency
is still emphasized with predicted frames. Various strategies for inserting intra frames
10 and signaling intra/predicted frames are described. With the adaptive multi-mode FEC,
an encoder adaptively selects between multiple modes to efficiently and quickly provide
a level of FEC that takes into account the bandwidth currently available for FEC. The
FEC information itself may be predictively encoded and decoded relative to primary
encoded information. Various rate/quality and FEC control strategies allow additional
15 adaptation to available bandwidth and network conditions.